

Engineering the Ideal Bird Beak:

An Integrated STEM Lesson Sequence for
Elementary Students

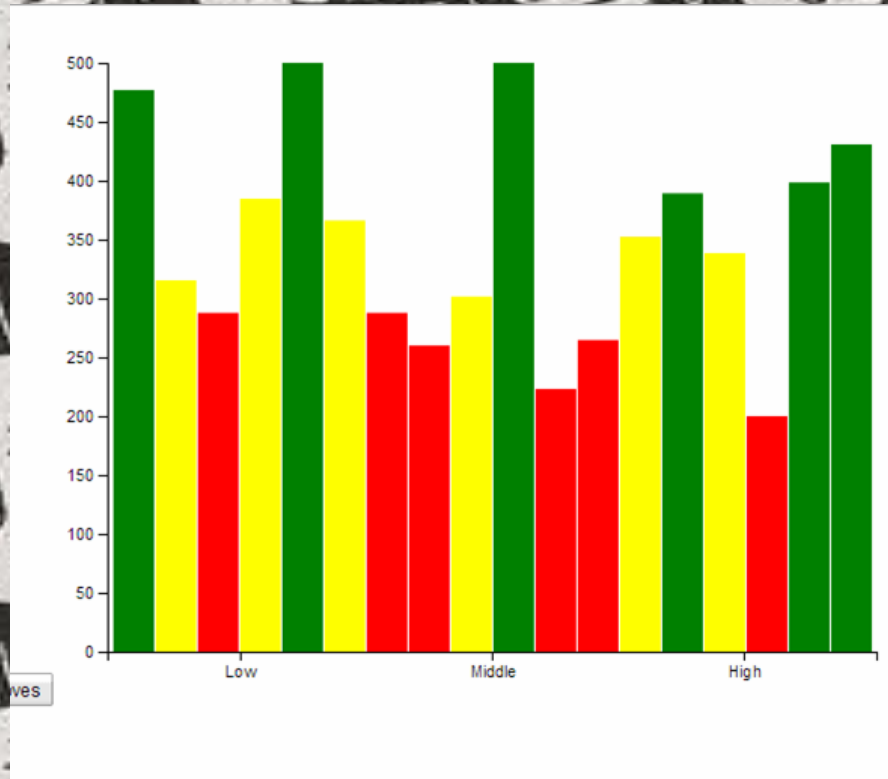
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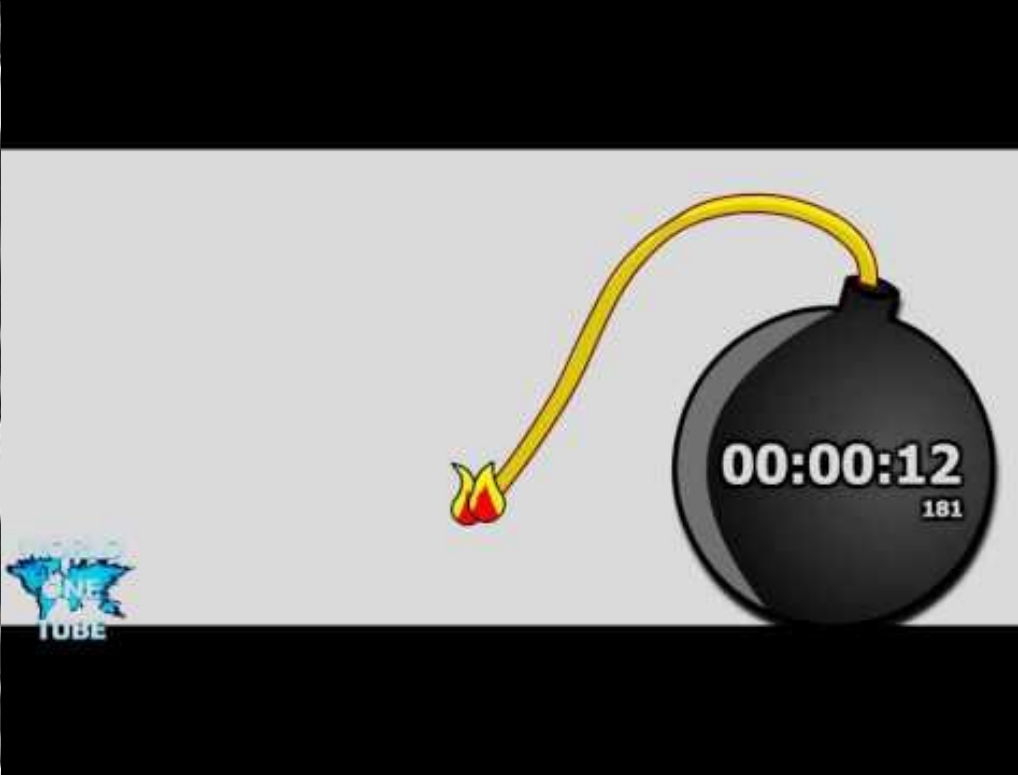
Engage Activity: Bird Beak Competition



Create A Bar Graph of Results



Talk to Your Partner:
Which Beak Would You Prefer? Why?



Please Watch this Video and Pay Careful Attention
to the Birds Beaks



Parrot

Reading Fluency Strategy

- Teacher Read Aloud
- Teacher Cloze Read
- Students Read Independently, Highlighting Key Details

Partners discuss the main idea of the passage, and then share out. Class decides as a group on a one-sentence main idea for the passage.

Why Are There So Many Beak Shapes?

A bird's beak (or bill) is a lightweight, bony elongation of its skull. Like a mammal's jaw, it's basically a two-part structure: the upper mandible and the



lower mandible. Nostrils are located on each side of the upper mandible, near the base. Like all bones in a bird's skeleton, the bones of the bill are filled with air cavities; the strength of the beak comes from the structure and shape of these cavities. Composed of keratin, like human fingernails and hair, the bill is hard and glossy. The tip and cutting edges of the bill are constantly renewed as they wear away.

Bird beaks are really multi-function tools. Birds use them like hands to weave twigs and grass into nests, to groom themselves and their mates and chicks, to attack competitors, to move eggs in the nest, to defend themselves and their nestlings - even to communicate information. In most birds the bill is black, but it can be almost any color or combinations of color. Did you know that bills change color as birds age or for the mating season? The most important function of a bird's beak is to gather or capture food.

Over generations, beaks have evolved into specialized organs. Birds that crack open seeds or nuts for food have extra reinforcement around the area where the seed is placed to be cracked. Birds that tear their feed (vultures for example) have structural enhancements near the tip of the bill - sometimes the tip is solid bone. Woodpeckers have extra shock-absorbing cartilage between their jaw joints.

Engineering the “Best” Bird Beak

Need:

To build a beak that can pick up the most food in 1 minute

Constraints:

- Use only the materials provided.
- You only have 15 minutes.



Test Your Design and Record Your Data



Test the Design

- 5 Trials – 1 minute Each
- Record in Data Table
- Create Bar Graph of Data

Using Google Sheets To Create Data Tables and Graphs

Go to bit.ly/BirdBeak

Fill in the number of items that your Beak was able to pick up in each trial.

Click on the graph to insert a bar graph.

Compare the bar graph to the one you drew by hand.

Students can then Revise their Designs

This can be tested again, making a new data table and graph using only google sheets.



What Do Birds With Better Beaks Get?

How does having a better beak for a given environment help a bird?



Debriefing The Lesson

What did we do as learners?

What instructional areas were integrated into this unit?

How did the activities build your understanding over time?

How might you change this unit for your own students?



Final Thoughts

STEM, STEAM, or STREAM is not a curriculum it is a mindset. It is not about the letters, it is about the integration of different content areas in order to solve a problem or complete a project.

Questions?

Feel free to contact me: slerma@mvusd.net

Thank you for coming to my session!